

WHO Classification of Digital Health Interventions

Update Summary

Changes have been made to reflect some of the comments and challenges expressed by the digital health community.

Where possible we have updated the language to ensure the DHIs are inclusive of healthcare systems that have a variety of policies and models for healthcare delivery.

The term “Client(s)” has been changed to “**Health service user(s)**” to address comments and concerns surrounding the use of that term.

We identified that members of the DH community are using the CDHI for additional use-cases beyond those that prompted the development of the classification scheme. These include:

- Portfolio analysis to organize digital health investments
- Informing legislation and regulation for digital health
- Education and training on digital health
- Research

Where recommendations were vague and without further supporting published evidence, they have not been included in the updates.

Digital Health Interventions

The Digital Health Interventions (DHIs) in the Classification are not meant to describe DHI delivery modalities (e.g., chatbots or wearables) or strategies/approaches for delivering a DHI (e.g., gamification, digital therapeutics) as such these terms are not captured in the classification. They are however, reflected in the synonyms and illustrative examples where necessary to facilitate usage and understanding of the Classifications.

The DHI classification is also not meant to describe the method/means by which DH technology functionalities are built to deliver DHI (e.g., using artificial intelligence). Users of the classification should understand that many DH tools and technologies utilize artificial intelligence mechanisms such as machine learning and natural language processing to build/develop the functionality of the tool.

The DHI classification is not meant to describe disease area interventions and so the language used reflects overarching digital health interventions that could apply to different disease areas.

The DHI classification is not intended to describe processes that DH tools employ in order to prevent unauthorized access, accidental loss or disclosure of information/ data (e.g., data security, data privacy) as on their own, these are governance processes that are employed in building DH tools and are not digital health interventions that address health system needs in themselves.

Where suggestions were deemed to already be captured within the existing classification, changes were not made. For example, in 1.7.1 contributory payments could be regarded as an out-of-pocket payment by clients and thus does not warrant a separate DHI within the Classification. Another example is that the financial management of facilities would be regarded as a subset of 3.5.6 under Health System Managers and therefore does not warrant a separate DHI of its own. However, these terms have been included in the synonyms to facilitate use of the CDHI and harmonization of different terms.

While taking into consideration the feedback from the DH community, the CDHI does not seek to provide granular details of every transaction performed by a DH tool in order to achieve a DHI. Therefore, where necessary the update includes additional descriptions under the ‘Synonyms’ and/or illustrative examples or consolidates existing DHIs into one to describe the DHI rather than outline specific details of the transactions.

1.0 Clients updates

- Clients now referred to as “**Health Service Users**”.
- Synonyms and illustrative examples added, to support different terminologies used to describe DHIs for health service users.
- Modifications:
 - Descriptions modified and included (under 1.6) to further highlight bi-directional communication as although mentioned in v1.0, was not adequately represented in a manner that enabled clarity.
 - 1.6.1 - modified to include interventions that provide health service information to health service users.
- New Digital Health Interventions:
 - 1.4.4 - addresses the digital verification of health status
 - 1.6.2 - addresses interactive and dynamic digital conversations with health service users.
 - New DHI category (1.8) and DHI intervention (1.8.1) included to address the management of consent provided by clients. This intervention is important to help address health system challenges around the lack of access to information or data (HSC 1.5) as well as around accountability (HSC 8) to facilitate transparency between healthcare providers and clients and encourage the lawful and appropriate use of client information.

2.0 Healthcare Providers updates

- Synonyms added, to support different terminologies used to describe DHIs for healthcare providers.

3.0 Health System Managers updates

- Synonyms and illustrative examples added, to support different terminologies used to describe DHIs for health system or resource managers.
- Modifications:
 - 3.4 consolidated to capture DHIs relating to civil registration and vital statistics. Transactions for birth and death events consolidated into one DHI respectively.
 - 3.5.1 wording updated, to address the inclusion of healthcare systems that have different financing schemes that are not insurance based.
 - 3.5.2 wording updated, to encompass administrative processes involved with billing, insurance and claims.
 - 3.5.6 wording updated, to encompass administrative processes for financial management of health systems' operations.
- New Digital Health Interventions:
 - 3.4.1 - Notify, register and certify birth event.
 - 3.4.2 - Notify, register and certify death event.
 - New DHI category (3.8) and DHI intervention (3.8.1) included to address the management of health service users' health certificates by health system managers.

4.0 Data Services updates

- Synonyms and illustrative examples added, to support different terminologies used to describe DHIs for data services. Artificial intelligence (AI) and machine learning have been added to the synonyms to reference the methods by which some functionalities are built.
- Modifications:
 - 4.1 description updated so that the parent category reflects the all-encompassing term of data management. The definition has also been refined to represent the attributes of data management.
 - 4.1.1 description modified to speak to data collection (not just routine) as a subset of data management.
 - 4.3 description modified to encompass DHIs that provide geo-spatial information management beyond location mapping.
 - 4.3.1 description modified to include households as fixed objects.
 - 4.3.3 description modified to encapsulate the mapping and tracking of health service users and settlements as movable entities.
 - 4.3.4 description modified to include tracking of healthcare providers.
- New Digital Health Interventions:
 - 4.3.5 - addresses the mapping of health and health indicator data to geographic data.
 - 4.4.2 - addresses the DHI for data services related to authentication and authorisation.
 - 4.4.3 - addresses the DHI for data services related to message routing services

System Categories

System Categories represent the types of ICT applications and information systems designed to deliver one or more digital health interventions.

Modifications:

- System Categories grouped into 5 intervention areas within the digital health enterprise architecture.
- Synonyms and typical functional areas included for some system categories to support clarity and aid classification of digital systems.
- Census and population information systems separated from data warehouse
- Client applications removed as a system category as too broad. Client applications that have a communication function would fall under client communication systems. Similarly, client applications that perform a diagnostic function would fall under the new system category – diagnostic information systems.
- Facility management information system has been made a subset of Health Management Information System (HMIS) as HMIS encompasses facility management systems.

New System Categories

- Diagnostics information systems
- Health program monitoring systems
- Blood banking systems
- Product catalogues
- Data warehouse systems
- Analytics systems

	Intervention areas within the Digital Health Enterprise Architecture	System Categories
1	Clinical support at point of service	F. Community-based information systems <i>Typical functional areas:</i> Community communication
		H. Electronic medical record systems <i>Synonyms:</i> Electronic health record <i>Typical functional areas:</i> Decision support, clinical decision support, record management, client registration
		Diagnostics information systems <i>Synonyms:</i> Diagnostic applications found in devices, wearables that collect patient-generated health data

		U. Pharmacy information systems <i>Typical functional areas:</i> Dispensing
		Y. Telemedicine systems
		D. Client communication systems
2	Health system management	N. Health management information systems (HMIS) <i>Includes:</i> K. Facility management information systems <i>Typical functional areas:</i> analytics and performance management <i>Synonyms:</i> Facility based performance management
		L. Geographic information systems (GIS)
		M. Health finance information systems <i>Includes:</i> Health insurance information systems <i>Synonyms:</i> tax management, public financial management, budget systems, health accounts
		T. Logistics management information systems (LMIS) <i>Includes:</i> Supply chain management systems
		Q. Knowledge management systems
		R. Laboratory information systems
		O. Human resource information systems
		Health program monitoring systems
		Blood banking systems
		S: Learning and training systems
		W: Research information systems
3	Metadata Registries	A. Census and population information systems
		B. Civil registration and vital statistics (CRVS)
		P. Identification registries and directories
		E. Terminology and classification systems <i>Synonyms:</i> Clinical terminology
		Product catalogues
4	Data Management services	A. Data warehouse systems
		G. Data interchange and interoperability <i>Synonyms:</i> Data accessibility
		X. Shared Health Record and Health Information Repository <i>Synonyms:</i> Longitudinal health records, national health domain-specific registries
		Analytics Systems <i>Synonyms:</i> Data visualization, dashboards, business intelligence, clinical data dashboards
5		I. Emergency response systems

Public Health and Electronic Integrated Disease Surveillance and Response (eIDSR)	Typical functional areas: Contact tracing, Case reporting, Case investigation
	J. Environmental monitoring systems
	V. Public health and disease surveillance systems Synonyms: Community based surveillance Typical functional areas: PH indicator reporting, case reporting, social media monitoring

Health System Challenges

Modifications:

- 1.2 description modified to speak to the challenge around timeliness of information.
- 7.2 description modified to include the lack of equitable resource allocation
- 7.3 description modified

New Health System Challenges:

- New category included – 9. Exclusion
- New health system challenges included:
 - 9.1 Inadequate literacy
 - 9.2 Inadequate representation

	Category	Health System Challenge
1	Information	1.1 Lack of population denominator
		1.2 Lack of timely information
		1.3 Lack of quality/ reliable data
		1.4 Communication roadblocks
		1.5 Lack of access to information or data
		1.6 Insufficient utilization of data and information
		1.7 Lack of unique identifier
2	Availability	2.1 Insufficient supply of commodities
		2.2 Insufficient supply of services
		2.3 Insufficient supply of equipment
		2.4 Insufficient supply of qualified health workers
3	Quality	3.1 Poor patient experience
		3.2 Insufficient health worker competence
		3.3 Low quality health commodities
		3.4 Low health worker motivation
		3.5 Insufficient continuity of care
		3.6 Inadequate supportive supervision
		3.7 Poor adherence to guidelines

4	Acceptability	4.1 Lack of alignment with local norms
		4.2 Programs which do not address individual beliefs and practices
5	Utilization	5.1 Low demand for services
		5.2 Geographic inaccessibility
		5.3 Low adherence to treatments
		5.4 Loss to follow up
6	Efficiency	6.1 Inadequate workflow management
		6.2 Lack of or inappropriate referrals
		6.3 Poor planning and coordination
		6.4 Delayed provision of care
		6.5 Inadequate access to transportation
7	Cost	7.1 High cost of manual processes
		7.2 Lack of effective and equitable resource allocation
		7.3 Health service user health expenditure
		7.4 Lack of coordinated payer mechanism
8	Accountability	8.1 Insufficient patient engagement
		8.2 Unaware of service entitlement
		8.3 Absence of community feedback mechanisms
		8.4 Lack of transparency in commodity transactions
		8.5 Poor accountability between the levels of the health sector
		8.6 Inadequate understanding of beneficiary populations
9	Exclusion	9.1 Inadequate literacy 9.2 Inadequate representation

